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MASTER OF MILITARY STUDIES

The Expanding Mission of the CH-53E Heavy Lift Helicopter

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13. ABSTRACT (MAXIMUM 200 WORDS) THE CH-53E WAS ORIGINALLY DESIGNED AS A HEAVY LIFT LOGISTICAL SUPPORT PLATFORM FOR THE MARINE CORPS. THE MISSION TASK OF THE CH-53E IS TO PROVIDE TRANSPORT OF HEAVY WEAPONS, EQUIPMENT, SUPPLIES, AND TROOPS. THE MOVEMENT OF HEAVY WEAPONS, EQUIPMENT, AND SUPPLIES IS THE PRIMARY FUNCTION AND TROOP ASSAULT IS SECONDARY FUNCTION OF THE CH-53E. HOWEVER, THE AGING OF THE CH-46E, DELAY ARRIVAL OF THE V-22, THE EXPANDING MISSION ROLES OF USMC, AND INCREASED OPERATIONS IN THE JOINT ENVIRONMENT HAVE CAUSED THE CH-53E MISSION TO EXPAND. THE CURRENT MISSION TASKS OUTLINED IN USMC DOCTRINE DO NOT MATCH THE REALITY OF HOW THE MARINE CORPS CH-53E IS EMPLOYED. THE CH-53E WILL BE USED TO CONDUCT USMC AND JOINT MISSIONS BASED ON ITS CAPABILITIES NOT ITS USMC DOCTRINAL MISSION. BUT, THE CH-53E AIRFRAME HAS NOT HAD ANY MAJOR AIRFRAME MODIFICATIONS FROM ITS ORIGINAL DESIGN TO INCREASE AIRCRAFT SURVIVABILITY. THE EXPANDED MISSION ROLES OF THE CH-53E HAVE AND WILL PUT THE AIRFRAME IN INCREASED THREAT ENVIRONMENTS THAT IT WAS NOT SPECIFICALLY DESIGNED FOR. THE CH-53E CONTINUES TO PERFORM THESE EXPANDED MISSIONS TODAY AND WILL IN THE FUTURE BUT NEEDS TO BE MODIFIED TO THE SAME SURVIVABILITY STANDARDS OF OTHER COMBAT AIRCRAFT.					
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EXECUTIVE SUMMARY

Title: The Expanding Mission of the CH-53E Heavy Lift Helicopter

Author: Major Brian J. Payne

Thesis: This paper will attempt to answer the question as to whether the Marine Corps heavy lift helicopter mission has changed and expanded beyond the capabilities, design, and acceptable risk for the CH-53E to support the Marine Air Ground Task Force (MAGTF) and joint missions with continued success. This paper will also analyze the Marine Corps doctrine for employment of the CH-53E in comparison to the actual employment of the aircraft on actual missions and identify if a mismatch exists and what needs to be done to ensure mission success in the future.

Discussion: The CH-53E was originally designed as a heavy lift logistical support platform for the Marine Corps. The mission task of the CH-53E is to provide combat assault transport of heavy weapons, equipment, supplies, and troops. The movement of heavy weapons, equipment, and supplies is the primary function and troop assault is secondary function of the CH-53E. However, the aging of the CH-46E, the delay arrival of the V-22, the expanding mission roles of the Marine Corps, and the increased operations in the joint environment have caused the CH-53E mission tasks to expand into increased combat assault support missions.

The current mission tasks outlined in Marine Corps doctrine do not match the reality of how the Marine Corps CH-53E is employed because of its capabilities. The actual mission conducted and the capabilities of the CH-53E, when compared with other services heavy lift aircraft and mission requirements, will continue to expand the missions of the CH-53E in the joint environment. This is because the CH-53E will be used to conduct joint missions based on its capabilities not its Marine Corps doctrinal mission. But, the CH-53E airframe has not had any major airframe modifications from its original design to increase aircraft survivability. Therefore, the expanded mission roles of the CH-53E have and will put the airframe in increased threat environments that it was not specifically designed for. The vulnerability of the CH-53E to survive in the future asymmetric threat environment are a risk not fully addressed. The CH-53E continues to perform these expanded missions today and in the future but needs to be modified to the same survivability standards of other combat aircraft to ensure high probability of mission success.

Conclusion: The CH-53E is a very capable aircraft with capabilities that will continue to be used today and in the future to support the MAGTF and the joint commander. The most important issue is the survivability and vulnerability of the CH-53E on the battlefield. This may present a risk that may not be acceptable, and must be addressed immediately by the Marine Corps. All effort must be put forth immediately to reduce the vulnerability of the CH-53E with improved Aircraft Survivability Equipment (ASE), armor, and major component protection to increase the probability of mission success in the threat environment of today. The outdated doctrine of the Marine Corps does not reflect the realities of how the CH-53E is performing mission tasks today. Aviation assault support doctrine must, therefore, be changed to reflect the realities of the capabilities of all aircraft and not limit aircraft due to traditional roles.

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Chapter 1

Introduction

Throughout history, military forces have adapted and used innovation to confront emergent threats. This has, on occasion, resulted in revolutionary innovations, but more often have been evolutionary. At the same time, changes in tactics and equipment use have had to happen out of pure necessity. Throughout its history, the United States Marine Corps has always been innovative in its outlook and pursued evolutionary as well as revolutionary solutions to meet every challenge.

However, many current capabilities, that were forward looking years ago, have since been pushed aside in favor of the next innovation. There is a delicate balance between preparing our forces for future conflicts and maintaining the capability to deal with the war with current threats.

The Marine Corps has been historically successful at developing innovative concepts in warfighting, which has kept the United States a step ahead of many of our adversaries. An example is the amphibious concept and equipment developed by the Marine Corps in the 1930s that proved instrumental in the Pacific campaigns of World War II. This spirit continues today and the Marine Corps is still known as an organization of “innovators” and “improvisers.”¹ However, being innovators and improvisers does not mean always looking to the battles of the future, but also includes understanding the battles the United States will fight today.

¹ Headquarters Marine Corps, *Aviation Implementation Plan*, Document, 2000-2001, 1-5. Cited hereafter as HQMC, AIP 00-01.

The current operational concept initially outlined in “From the Sea” (and further through “Marine Corps Strategy 21,” to include “Operational Maneuver from the Sea” [OMFTS], and Expeditionary Maneuver Warfare [EMW]), has become the concept that states the requirements and vision for Marine Corps aviation. The Aviation Implementation Plan (AIP) for Headquarters Marine Corps is based on required capabilities and implementing actions of “Marine Corps Strategy 21” (MCS 21) and outlines the future plans of Marine Corps aviation to support these concepts. The assault support section shows that to support future operations of the Marine Corps and joint forces, the continuation and requirement for the CH-53E will continue beyond the year 2015.²

Since it was first introduced in 1981 the CH-53E is the Marine Corps primary heavy lift helicopter to the year 2015 and beyond. A replacement airframe to conduct the CH-53E heavy lift mission has not yet been determined, with the exception of the need for a generic, undefined heavy lift replacement (HLR). The medium lift replacement (MLR) aircraft to replace the CH-46E medium lift helicopter’s mission has been chosen to be the MV-22 Osprey.

The doctrinal mission and mission tasks of the heavy lift and medium lift helicopters have not changed dramatically for the Marine Corps over the years and plans for a heavy lift helicopter mission to change are not addressed in any of the future innovative concepts of the Marine Corps. These operational concepts focus on the fielding of the MV-22 and how its projected capabilities will change the future of Marine Corps aviation operations in regards to medium lift and assault support. These future ideas and innovations may improve the warfighting capabilities of the Marine Corps in the future, but while these new concepts and capabilities are unrealized, the threats and wars of today must still be dealt with now, as well as in the future.

² HQMC, AIP 00-01, B-1.

The delayed development of the MV-22 and the degrading CH-46E, due to age of the airframe and engine degradation, have caused a shortfall in lift available for the Marine Air Ground Task Force (MAGTF) concept in the Marine Corps. This has decreased the ability of the MAGTF to conduct air assault and logistical support using aviation. This problem is well known and many adjustments have been taken to reduce this shortfall. The general belief is that as soon as the MV-22 is fielded, the operational shortfall will be eliminated and everything will fall into place and work as planned. This hope and flawed belief has been relied on for more than a decade as the CH-46E ages, and postponements in the arrival of the MV-22 continue. Therefore, the solution has been an increased reliance on the CH-53E to fill this shortfall in assault support lift for the MAGTF and joint force commander.

The CH-53E has been filling the shortfall requirements of the medium lift CH-46E for more than a decade because of its capabilities. Many proposals, such as organizing the Marine Expeditionary Units (MEU) with more CH-53Es and less CH-46Es, rebuilding the CH-46E, buying an interim aircraft, or buying more CH-53Es have been addressed over the years to fix the lift shortfall in assault support for the MAGTF. However, these proposals have been met with much controversy and debate, and no official solution has been agreed upon except to wait for the hoped for arrival of the MV-22. At the same time, the Marine Corps has not modified or updated the original concept of deployment or doctrinal mission tasks, developed more than a decade ago, for the assault support aircraft.

The Marines have been forced to use innovation and initiative to accomplish the many missions of the MAGTF in today's joint environment. The Marine Corps has done this by using the assets on hand, in particular the aviation assault support assets, to accomplish the mission regardless of what the doctrine states. The CH-53E has been one of the assets used extensively

in assault support missions, because of its capabilities, which has resulted in mission creep and over tasking through the years. While the expansion of the CH-53E's mission has increased, the risk and consequences are being overlooked or ignored.

This paper will attempt to answer the question as to whether the Marine Corps heavy lift helicopter mission has changed and expanded beyond the capabilities, design, and acceptable risk for the CH-53E community to support the MAGTF and joint missions with continued success. To analyze the question and find an answer, several issues must be examined. First, the basic design requirements must be reviewed in comparison with the mission requirements outlined when the CH-53E was first developed. This will include changes to the airframe through the years from the original design of the airframe to today. Second, this study will review the doctrinal mission of the CH-53E through the years. Third, this study will look at the missions the aircraft has performed through the years and compare the operational mission statements to discover if a change or evolution of the mission has occurred. Fourth, the current assault support aviation situation and the joint environment will be examined for the realities of today and in the future. Fifth, this study will look at what the future may hold in regards to threat and risk to Marine Corps aviation lift today and future concepts. Finally, this study will analyze the risk in comparison to mission accomplishment and identify any shortfall and what actions can be taken to minimize it.

The CH-53E will be a Marine Corps asset in the future and therefore must be recognized as part of future concepts. The mission and roles assault support will play have not completely been identified in the future except in the vision concepts of what we think will happen. History has proven that if the past is not studied and the direction that the world is moving is not recognized, the result will punish the blind in the future. Mistakes in wars and the missions of

the military are not forgiving. The oversights due to blinded vision and traditional thinking of war fighting may result in the wrong decisions in the future that will punish the Marine Corps and the Nation in ways that cannot be easily reversed. This may be the case of the Marine Corps CH-53E.

Chapter 2

Development of the CH-53E

The Navy, concerned over delays in movement of unflyable tactical aircraft to repair facilities, identified the initial heavy lift requirement in May 1965. The following year, the Marine Corps identified a similar requirement for the retrieval of downed aircraft and movement of heavy essential combat equipment, which exceeded the capabilities of available helicopters, including the new CH-53A.³ The CH-53A was introduced in combat in 1967 and would improve heavy lift, but was not able to recover itself or lift many other items of equipment.

The key requirement became the need for a Heavy Lift Helicopter (HLH) that could lift 18 tons at sea level on a 90-degree day, hovering in ground effect. This capability would allow the lifting and transport of 97 percent of the Marine Corps combat equipment.⁴ The original HLH program was a joint venture between the Navy and the Army. The individual service requirements to develop the helicopter were outlined in the Specific Operational Requirement (SOR) document, referred today as an Operational Requirement Document (ORD), on 24 October 1967.⁵

The SOR document outlined the operational need in the Navy and Marine Corps for a HLH. This document was written based on the perceived threat, operational deficiencies, and current capabilities of the time. The main shortfall was seen as the Navy and Marine Corps inability to

³ Department of the Navy, *CH-53E Program History*, Document, No date, 1. Cited hereafter as DON, CH-53E History.

⁴ DON, CH-53E History, 1.

⁵ DON, CH-53E History, 2.

maintain the doctrine and the capabilities to conduct missions operating from the sea against any threat. This operational deficiency was stated in the SOR:

The Operational Deficiency. There is no heavy lift helicopter currently operational, or under development, which is capable of fulfilling the Navy/Marine Corps heavy lift requirements for logistic resupply, support of construction projects, tactical movement of combat equipment, recovery of damaged equipment, and the removal of unflyable aircraft.⁶

The lift capabilities in the Department of Defense at the time were outlined as the CH-53A at 9.5 tons, the CH47B at 10.2 tons, and the CH-54A at 12.3 tons, with only the CH-53A capable of shipboard operations. The lift capabilities of the all aircraft were far short of the 18 ton lifting requirement.⁷

According to the system description, the aircraft would be a multi-turbine powered, dual control, all-metal, all-weather helicopter capable of lifting an 18-ton payload at cruise speed of 125 knots. The concept of employment for the HLH specifically outlined by the SOR document that drove the design of the HLH was as follows:

1. Logistical resupply.
2. Support of construction Projects.
3. Tactical movement of combat equipment.
4. Recovery of damaged equipment.
5. Removal of unflyable aircraft.⁸

This outline became the basis for the future mission tasks of the HLH based on the design requirements of the airframe to meet the specific tasks. Additionally, the aircraft had to meet design requirements for all Navy and Marine Corps aircraft, to include being shipboard operations capable.

⁶ Department of the Navy, *Specific Operational Requirement 14-20 Heavy Lift Helicopter*, Document, October 24, 1967, Enclosure (2), 1. Cited hereafter as DON, SOR 14-20.

⁷ DON, SOR 14-20, Enclosure (2), 2.

⁸ DON, SOR 14-20, Enclosure (2), 3.

The fact that the HLH airframe might be used in combat was not overlooked in the original SOR. The SOR was written during the Vietnam War and combat flying was a reality for any military aircraft. Aircraft survivability was identified as an important feature and was outlined in the SOR under the category of additional items influencing the design.

This included the following requirements for survivability:

1. Passive Defense. The HLH will be designed for maximum survivability with minimum compromise of the helicopter's performance. Vulnerability shall be a factor in the aircraft design and will be established by analyses and theoretical evaluation.
 - a. It is desired that the aircraft's vulnerability to infrared missiles be reduced to a minimum, consistent with the stated performance requirements.
 - b. The aircraft's useful load will include armor, as necessary, to protect the cockpit and other vulnerable and vital areas of the helicopter. The armor shall be easily removable, of minimum weight, and provide protection against 12.7mm projectiles.
 - c. The HLH will be provided with self-sealing, internal fuel cells to provide protection from 12.7mm projectiles.⁹

On 28 October 1970, it was determined that a combined Army and Navy HLH aircraft, that met the Army's minimum requirements, would be too big for the Navy to use on ships. The Navy then made a decision to investigate the practicality of reengineering significant performance improvements to the H-53 series helicopter in order to meet the HLH requirements of the Navy and Marine Corps.¹⁰ This marked a departure from the HLH program and was the beginning of the CH-53E program, vice the HLH program, with a mission need statement produced on 17 January 1972, which outlined the requirements for the future CH-53E.¹¹

The first CH-53E aircraft was conceived as an Engineering Change Proposal (ECP) to the

⁹ DON, SOR 14-20, Enclosure (2), 16.

¹⁰ DON, CH-53E History, 13.

¹¹ Department of the Navy, *Mission Need Statement Department Of The Navy Heavy Transport Helicopter*, Document. January 17, 1972, 1.

CH-53D and emphasized commonality of parts between both the CH-53D and CH-53E. The CH-53E program was funded in 1973 and the first flight was conducted on 1 March 1974.¹² The Comptroller General's Office of the United States in February 1977 submitted their "Report to the Congress" and stated "The CH-53E after much engineering improvement and development efforts resembled a new aircraft rather than a growth version of the CH-53D."¹³ After many years of budget issues, engineering improvements, procurement reductions, and developmental production delays the first CH-53E Super Sea Stallion was accepted by the Navy in December 1980 and the United States Marine Corps received their first aircraft on 16 June 1981.¹⁴ The CH-53E final production model had been designed and produced to the basic original design requirements of the HLH SOR and the follow on Mission Need Statement (MNS) of the Navy except for incorporation of aircraft survivability.

The first operational deployment of the CH-53E was in May 1983, with four aircraft aboard the USS *Iwo Jima* (LPH-2) with the Marine Amphibious Unit. The CH-53E soon afterward became the primary heavy lift asset for the Marine Corps, replacing the CH-53D. This did not end the future of the CH-53D, which is still in operation today. The Marine Corps continued to take delivery of the CH-53E after some restructuring and by 1996 the CH-53E community consisted of one training, six active, and two reserve CH-53E squadrons.¹⁵

The Marine Corps originally planned to purchase only 54 CH-53Es to augment the CH-53D squadrons for heavy lift missions. However, a later decision was reached to make the CH-53E the primary heavy lift helicopter for the Marine Corps as a replacement for the CH-53D.

¹² DON, CH-53E History, 19.

¹³ DON, CH-53E History, 26.

¹⁴ DON, CH-53E History, 55.

¹⁵ Marine Corps Reference Publication (MCRP) 5-12D, *Organization of Marine Corps Forces*, Washington, DC: Headquarters United States Marine Corps, 13 October 1998, 3-4, 3-5, 3-6, 3-7.

This resulted in the Marine Corps needing to procure a minimum of 172 CH-53Es for the active forces and 18 for the reserve forces based on a 1994 Navy lift study.¹⁶ However, the Marine Corps, as of 4 January 2001, has only 165 CH-53Es, which includes 11 airframes that are in storage.¹⁷ The CH-53E total for the Marine Corps, even after receiving 15 older CH-53Es from the Navy and losing 19 to mishaps, remains short 7 aircraft of what the study on lift stated the Marine Corps needed as a minimum. The Marine Corps and Navy have no future plans for the procurement and production of more CH-53E aircraft leaving a current shortfall in Marine Corps heavy lift assault support.

From the first delivery of the CH-53E in 1981, the aircraft has gone through several upgrades and modifications with future enhancements and upgrades planned if budgets allow. Most of the improvements have been to aircraft systems and dynamic components for increased reliability and safety of flight. Upgrades in avionics, to include radios, global positioning system, and a forward-looking infrared radar system, have been incorporated to reduce cockpit workload and improve mission performance.

The only aircraft survivability designs or systems originally produced for the CH-53E aircraft were Kevlar seats for the pilots and two gun mounts in the crew window and crew door. Follow on combat survivability airframe modifications included Airframes Change (AFC) 310 and the installation of the AN/ALE 39 countermeasures dispensing set.¹⁸ This was an outdated fixed wing system dating back to Vietnam that was modified for rotary wing for defense against infrared surface to air missiles. By the end of the 1980s, AFC 337 was added, which included an

¹⁶ Gidget Fuentes, "Corps Wants A CH-53E Lift," *Navy Times*, 21 November 1994, 34.

¹⁷ Program Management Air 261, *CH-53D/E Location and Inventory*, Document, 4 January 2001.

¹⁸ Naval Air Training and Operating Procedures Standardization (NATOPS) Manual. *Navy Model CH-53E Helicopter*, Washington, DC: Department of the Navy. March 31, 2000, 46. Cited hereafter as 53 NATOPS.

AN/APR 39(V)1 radar warning receiver for detection of surface to air missile radars.¹⁹

However, AFC 337 was halted after only approximately a third of the aircraft were completed and the rest of the aircraft were never budgeted for completion. One plan was to install an improved system called the AN/APR 39(V)2 in all CH-53E airframes, but this critical AFC has yet to be funded.²⁰ The addition of any advanced Aircraft Survivability Equipment (ASE), armor protection for vital areas, and aircraft self defense capabilities have not been pursued for acquisition.

¹⁹ 53 NATOPS, 48.

²⁰ Program Management Air 261, *The Heavy Lift Quarterly*, Newsletter, December 2001, 3. Cited hereafter as PMA 261, newsletter.

Chapter 3

CH-53E Heavy Lift Helicopter Doctrinal Mission

The United States Marine Corps has developed its doctrine through the years and developed the concept of maneuver warfare beginning in the 1980s. These doctrinal concepts established the basis for the missions and tasks of the Marine Corps units of the MAGTF to train and perform in order to accomplish the mission. The MAGTF consists of four primary elements, the command element (CE), ground combat element (GCE), aviation combat element (ACE), and the combat service support element (CSSE).

The ACE is task organized and combines aircraft, equipment, and personnel from other units to establish a broad range of capabilities. One unit is the Helicopter Marine Heavy (HMH) squadron, which supplies the CH-53E to the ACE to conduct the heavy lift helicopter mission for the MAGTF. The doctrinal mission of the HMH squadron dating back to 1990, is as follows:

The mission of the HMH squadron is to provide assault helicopter transport of equipment, supplies, and combat troops during amphibious operations and subsequent operations ashore.²¹

The current CH-53E Tactical Manual states the doctrinal mission a little differently from what it was in 1990:

The CH-53 mission is to provide assault transport of heavy weapons, equipment, and supplies during amphibious operations and subsequent operations ashore.²²

The major difference in the two mission statements is the removal of the requirement to transport

²¹ Fleet Marine Force Manual (FMFM) 5-3. NWP 55-9-ASH, Vol. I (Rev. E). *Assault Support Helicopter Tactical Manual*. Washington, DC: Department of the Navy, January 1990, 1-2. Cited hereafter as ASH, 1990.

²² NWP 3-22.5-CH53, Vol. I. *CH-53 Tactical Manual*. Washington, DC: Department of the Navy, August 1997, 1-1. Cited hereafter as 53 TACMAN, 1997, 1-1.

combat troops and the addition of transporting of heavy weapons.

HMH squadrons were tasked with 11 missions in 1990, ten of which are the same as are assigned to the Helicopter Marine Medium (HMM) lift squadron, except for the following variations in the wording of the tasks:

1. Provide combat assault transport of heavy weapons, equipment, supplies, and troops. Movement of heavy weapons, equipment, and supplies is the primary function, and troop assault is secondary.
2. (Added task) Conduct tactical retrieval and recovery operations for downed aircraft, equipment, and personnel.
3. Maintain capability to deploy and conduct extended range operations employing aerial refueling appropriate to assigned aircraft.

Both the HMH squadrons and the HMM squadrons are assigned the task to “Maintain self defense capability from ground to air and air to air threats.”²³

The mission tasks in the current CH-53 tactical manual have remained the same since 1990, except the only change involved was dissecting the original first task into two separate tasks as follows:

1. Provide combat assault transport of heavy weapons, equipment, and supplies as a primary function.
2. Provide combat assault of troops (exclusive of the initial assault wave infantry) as a secondary function.²⁴

The current Marine Corps “Aviation Implementation Plan” for 2000-2001 gives guidance for Marine Corps aviation to 2010, and the MCRP 5-12D, “Organization of Marine Forces,” both state the same mission and mission tasks for the CH-53E.²⁵ All the Marine Corps training publications and all other supporting warfighting publications state the same mission for the CH-53E.

²³ ASH, 1990, 1-2.

²⁴ 53 TACMAN, 1997 1-1.

²⁵ HQMC, AIP 00-01, B-3 and MCRP 5-12D, 3-28.

The conclusions and interpretations from all the publications is that the mission and mission tasks of the CH-53E is combat logistical support. This could be in the form of carrying combat engineering gear, artillery pieces, supplies, fuel, and troops to the front. The doctrinal mission is mainly perceived to be an asset to maintain the resupply of the forces forward in the battle but not to be forward in the battle. This is similar to the mission outlined in the original requirements for the design and building of the CH-53E.

Chapter 4

The Evolution of the CH-53E Mission

The CH-53E is a very capable aircraft because of its speed, range, lift capability, and shipboard compatibility compared to all other helicopters. Everyone in the warfighting community knows this and, in the spirit of mission accomplishment, the CH-53E mission has expanded through the years. Commanders have used doctrine as a guide, but have used innovation and initiative to accomplish missions using available assets. This has resulted in the CH-53E being used in a wide range of missions that it was not originally designed for. Many of these missions were conducted during real world contingencies simply because of a lack of any other aircraft capable of conducting the mission at the time.

The main reason the CH-53E is doing more is because of the degradation of the medium lift helicopter, the CH-46E, which only gets worse with the delayed arrival of its schedule replacement, the MV-22. This, in conjunction with new developments and techniques in Marine Corps tactical warfighting, has caused a dilemma in the assault support role for the ACE. The heart of assault support for the ACE and primary vertical lift troop transport vehicle is the medium lift helicopter with the primary mission:

The HMM provides assault transport of combat troops in the initial assault waves and follow-on stages of amphibious operations and subsequent operations ashore.²⁶

The problem is that the CH-46E was originally designed to carry 25 combat troops, but now has a typical load of between 8 and 18, depending on range, fuel load, and ambient conditions.

²⁶ MCRP 5-12D, 3-29.

The CH-53E has the capability to carry 37 combat troops (and up to 55 with centerline seats) to its maximum range of 430 nautical miles. However, an administrative restraint has been imposed on the CH-53E that limits the lift to 24 combat troops during training.

The ACE has a shortfall in assault support lift it can provide to the MAGTF to accomplish the missions assigned using the CH-46E. The CH-53E has had to make up for this shortfall in addition to performing its doctrinal mission. The fact that the CH-53E has the capability of moving a lot of equipment and troops farther and faster has made the CH-53E the logical choice for assault support missions. It has allowed the MAGTF and joint commander the ability to build up combat power quickly and to operate at a distance. This same concept has driven the Marine Corps to look at the MV-22 to replace the aging CH-46E in the medium lift role. The MV-22 can carry more troops (24) for a longer distance and at greater speed than the CH-46E.

Different aircraft have been called on many times to conduct real world missions regardless of the doctrinal employment that would otherwise limit their use. This is because during mission analysis the asset, regardless of service, was picked that can best accomplish the mission. This has been the case with the H-53 when required to support the Marine Expeditionary Unit, Special Operations Capable (MEU (SOC)) MAGTF; the Iran hostage rescue attempt called “Desert One” in 1980; the Non-combatant Evacuation Operation (NEO) in Somalia called “Eastern Exit” in January 1991; the Tactical Recovery of Aircraft and Personnel (TRAP) mission for the rescue of Captain Scott O’Grady in Bosnia in June 1995; the multiple NEOs conducted over the years in Liberia, Albania, and Sierra Leone; the many United Nations support missions to include Somalia, Kosovo, East Timor, Rwanda, and Desert Shield/Storm; and Task Force 58 in Afghanistan in support of Operation “Enduring Freedom,” and the war on terrorism.

MEU (SOC)

The MAGTF relies on the ability to use aviation assault support to get troops and gear to the objective to build combat power to accomplish the mission. For example, the MEU (SOC) was developed in 1987 as the most forward deployed unit of the MAGTF.²⁷ The MEU (SOC) is designed and trained to serve as a Joint Task Force (JTF) enabler for follow on forces as needed. Prior to being designated SOC, a MEU must undergo a specialized workup period and qualification in the following missions:

1. Amphibious Raid (boat, helicopter, and mechanized).
2. Single and multi-site Non-combatant Evacuation Operations (NEO).
3. Security Operations (area and physical security to Embassy or consulate-type facility).
4. Tactical Recovery of Aircraft and Personnel (TRAP).
5. Direct Action Mission (destruction or recovery operations).
6. Humanitarian Assistance/Disaster Relief.
7. Rapid Response Planning Process (R2P2).
8. Intelligence, Surveillance and Reconnaissance (ISR).
9. Long Range Raid (requiring forward arming and refueling point (FARP) operations).
10. Mass Casualty.
11. Airfield/Port Seizure Operations.
12. Maritime Special Operations (Gas and Oil Platform [GOPLAT]) and Visit, Board, Search and Seizure (VBSS).²⁸

The successful completion of all these qualifications must be achieved for the designation as a MEU (SOC). All of these events require ACE support, except for the mechanized and boat raids. To accomplish these missions the primary doctrinal ACE asset is the CH-46E.

The MEU (SOC), as the forward deployed unit of the Marine Corps, has evolved into a unit very capable in performing a variety of different missions using all the elements of the MAGTF.

²⁷ LtCol H.T. Hayden, (ed.), *Shadow War: Special Operations and Low Intensity Conflict*, Vista, CA: Pacific Aero Press, 1992, 33.

²⁸ Marine Corps Order 3502.3A, *Marine Expeditionary Unit (Special Operations Capable) Predeployment Training Program (MEU(SOC) PTP)*, 10 Jan 01, 6.

The major deficiency has been the ACE assault support lift designed around the HMM composite squadron with the CH-46E as the primary lift asset. The standard HMM composite squadron consists of twelve CH-46E, four CH-53E, four AH-1W, three UH-1N, and six AV8B aircraft. The ACE has had to rely on the CH-53E to perform the medium lift missions to support the MEU in order to satisfy MEU (SOC) requirements.

The CH-53E community has trained and executed its own doctrinal mission and the mission tasks of the medium lift helicopter. This means an HMM squadron may be the ACE commander for a MEU (SOC) in 1993 with a modified deployment package consisting of eight CH-53E, four CH-46E, four AH-1W, three UH-1N, and six AV-8B.²⁹ This includes the full SOC qualifications for all missions using the CH-53E as the primary lift asset instead of the CH-46E. This is reflected in the training changes in the CH-53E community over the years.

Desert One

The reason the H-53 helicopter was chosen to conduct this mission is important to understand in terms of the joint environment today and in the future. The joint and coalition world will make similar decisions in the future similar to how it was done for this particular mission in regards to airframe selection based on capabilities. The helicopter selected was based on assets available to the Task Force from the aircraft in the inventory of the Department of Defense in 1980.

The task force staff concluded that the helicopter that would be necessary had to have certain capabilities and meet specified requirements for the plan. The helicopters had to be able to take

²⁹ Authors own experience with the 31st MEU(SOC) 1993-1994.

off from a ship and then fly 600 miles at altitudes between 500 feet and 11,000 feet over mountains, as well as carry a heavy payload of troops and equipment.³⁰ After looking at the H-46, H-47, H-53 series helicopters (CH-53E was not operational yet), the decision was made to use the RH-53D because of its capabilities in lift, speed, range, altitude performance, and its shipboard operability.³¹ The decision to use the RH-53D was based strictly on the capabilities of the aircraft and not on the service it belonged to or the doctrinal mission it normally performed.

The RH-53D was a Navy mine sweeping platform and not a troop insertion platform. The doctrinal mission task that the airframe was designed for was not considered in the decision process or its selection to perform the mission. The staff used the basic airframe capability to determine the helicopter to select for the mission. This will prove the same today in that limited assets drive the selection of an aircraft to perform certain missions and the decision will not be based on service doctrine for the use of that aircraft, but rather on the capabilities of the aircraft itself. This suggests that any aircraft in the Department of Defense could be tasked to perform a mission at any time that it was not specifically designed to perform. This is the reality of the joint environment where the joint commander will use anything and everything at his disposal to achieve the mission goal. The failure of the Desert One mission was due to many other factors, which are not relevant and specific to the airframe type.³²

³⁰ Paul B. Ryan, *The Iranian Rescue Mission: Why It Failed*, (Annapolis, MD: Naval Institute Press, 1985), 36.

³¹ Ryan, 37.

³² For more info on the Iranian Rescue Mission and its reason for failure read Paul B. Ryan's Book.

Operation Eastern Exit

The NEO conducted in January 1991 at the American Embassy in Mogadishu, Somalia, was a basic mission that the MEU (SOC) and all MAGTF units trains for and is ready to conduct. The request for the evacuation of the embassy in Mogadishu was received on 2 January 1990, resulting in Operation “Eastern Exit.” This operation was during the Gulf War when most military assets were concentrating on the Persian Gulf. A contingency MAGTF was formed from the 4th Marine Expeditionary Brigade in the Persian Gulf and embarked aboard the USS *Guam* (LPH 9) and USS *Trenton* (LPD 14) and headed for Somalia at top speed on 3 January.³³ The situation had degraded so that the primary method of evacuation by aircraft at the airport was not possible because of unsafe conditions at the airport.³⁴

The mission was given to the MAGTF, which looked at all options to conduct the NEO, but due to the inland location of the embassy, determined that an air option with helicopters would be necessary.³⁵ The question became whether to use the CH-46E or the CH-53E to conduct the mission. Because of the limited range of the CH-46E, the CH-53E was the aircraft selected. The threat to the aircraft in Mogadishu for the mission included surface to air missiles and antiaircraft artillery throughout the city.³⁶

After armed looters entered the embassy compound late on 4 January, the decision was made to launch the NEO force. At 0247 on 5 January 1991, two CH-53Es were launched 466 nautical miles out from the USS *Trenton*. The aircraft contained 51 Marines and 9 Navy SEALs and,

³³ John Pike, *Operation Eastern Exit*, 5 March 2000, USMC Research Center, URL: http://www.fas.org/man/dod-101/ops/eatern_exit.htm, accessed 7 January 2002.

³⁴ Pike, *Operation Eastern Exit*.

³⁵ Adam B. Siegel, *Eastern Exit: The Noncombatant Evacuation Operation (NEO) From Mogadishu, Somalia in January 1991*, (Alexandria, VA: Center For Naval Analyses, October 1991) 16.

³⁶ Siegel, 22.

after two night aerial refueling evolutions, arrived at the embassy at 0710.³⁷ The two CH-53Es landed without any noticeable resistance albeit hundreds of armed Somalis on ladders were scaling the embassy compound wall. The evacuation began after the security force was deployed and 61 personnel were transported back to the ship with one additional aerial refueling evolution enroute.³⁸ The rest of the embassy personnel were finally evacuated the next evening by the CH-46Es and CH-53Es of the MAGTF after the ships had arrived within CH-46E range.

Captain Scott O'Grady Rescue

On 8 June 1995 the 24th MEU (SOC) conducted a TRAP mission to rescue Captain Scott O'Grady, a United States Air Force F-16 pilot shot down in Bosnia.³⁹ This was a standard contingency mission planned by the MEU (SOC). The MEU (SOC), along with the Joint Special Operations Task Force in Italy, had been on alert to the possibility of rescuing the pilot after he was shot down on 2 June 1995.⁴⁰ The TRAP mission had been planned using two CH-53Es, two AH-1Ws, and four AV-8Bs. The MEU had based this package on preplanned TRAP scenarios using the capabilities of the airframes. In addition, a standby mission called "Sparrow Hawk" (a platoon-sized security force) was incorporated to reinforce the trap mission if necessary using the last two available CH-53Es.⁴¹

³⁷ Edwin Howard Simmons, *The United States Marines: A History Third Edition*, (Annapolis, MD: Naval Institute Press, 1998), 300.

³⁸ Pike, *Operation Eastern Exit*.

³⁹ Maj Timothy J. Jackson, "An Analysis of the Rescue in Bosnia," *Marine Corps Gazette*, August 1995, 23.

⁴⁰ Mary Pat Kelly, "Good to Go" *The Rescue of Scott O'Grady from Bosnia* (Annapolis, MD: Naval Institute Press, 1996), 76.

⁴¹ Kelly, 279.

In the early morning of 8 June the decision was reached to launch the TRAP mission from the MEU (SOC) after positive contact was made with the downed pilot.⁴² The TRAP package launched at sunrise but was delayed 45 minutes as a strike package arrived to suppress Serbian air defenses. The TRAP package proceeded to the pickup site and did not experience any enemy resistance during the ingress flight because of low-lying fog and cloud cover that obscured the flight from the ground.⁴³

The egress from the pickup site back to the ship was more eventful because the ground fog largely burned off and the cloud layer was lifting. The flight was targeted by two confirmed man portable shoulder launched Infra Red (IR) Surface to Air Missiles (SAM), Z-23 anti-aircraft (AA) fire, and small arms fire from ground forces.⁴⁴ Fortunately, all the aircraft made it back to the ship and the mission was a success. The only damage from enemy fire was to the two CH-53Es from AA and small arms fire which resulted in major damage to a main rotor blade of the first aircraft and damage to the tail rotor blade and ramp of the second aircraft.⁴⁵

Task Force 58 (Afghanistan)

The events of 11 September 2001 called on the United States Marine Corps to deploy yet again to support United States policy. The forward deployed MEU (SOC)s responded by sailing toward the Arabian Sea to get as close as possible to Afghanistan. The 15th MEU (SOC) responded first and positioned itself in the Arabian Sea to support Operation “Enduring Freedom” in the war on terrorism in Afghanistan.

⁴² Kelly, 150.

⁴³ Kelly, 200-248.

⁴⁴ Kelly, 263-283.

⁴⁵ Kelly, 281.

The first action of the ACE assault support was to launch two CH-53E helicopters on 20 October 2001 on a TRAP mission to Pakistan to recover a crashed Army MH-60 helicopter. The CH-53Es, while refueling, were fired upon by unknown forces and after returning limited fire had to abort the mission.⁴⁶ The CH-53E TRAP package returned days later and completed the recovery mission by externally transported the Army MH-60 to the USS *Kitty Hawk* in the Arabian Sea.⁴⁷

The 26th MEU (SOC) and the 15th MEU (SOC) were then combined into Task Force 58 and on 25 November 2001 “kicked in the Taliban’s back door” in Afghanistan.⁴⁸ The first United States-led ground operation, called “Swift Freedom,” was to capture a small desert airstrip 80 miles from the Taliban controlled town of Kandahar.⁴⁹ The initial raiding force was conducted with six CH-53Es loaded with combat troops and equipment, and which launched off the USS *Peleliu* in the Arabian Sea, flying more than 400 miles with one aerial refueling evolution to insert the Marine Corps assault force.⁵⁰ Follow on forces arrived by C-130 and CH-46E helicopters and subsequent waves of CH-53Es. This was “believed to be the largest, longest range, inland assault by the Marine Corps in nearly a century.”⁵¹

The force continued to build up to more than 1500 troops to occupy the forward base, later called camp “Rhino.” The now forward deployed CH-53Es went into action again on 5 December 2001 when they were used to conduct the evacuation of Special Operation Forces personnel north of Kandahar.⁵² This mission depended on the speed and high altitude

⁴⁶ Laurence McQuillian and Andrea Stone, “Mystery Attackers Fire At U.S. Forces In Pakistan,” *USA Today*, 24 October 2001, 7.

⁴⁷ Cesar G. Soriano, “Elite Marine Unit Makes First Strikes On Taliban,” *USA Today*, 5 November 2001, 6.

⁴⁸ Mark C. Brinkley, “Our Turn,” *Marine Corps Times*, 10 December 2001, 12.

⁴⁹ Brinkley, “Our Turn,” 12.

⁵⁰ Brinkley, “Our Turn,” 12.

⁵¹ Brinkley, “Our Turn,” 12.

⁵² “Marines kill 7 Taliban, capping week of increased activity,” *Marine Corps Times*, 17 December 2001, 14.

performance of the CH-53E to retrieve the personnel located in a mountainous hostile area. The CH-53Es continued to support the Task Force and were augmented by four more CH-53Es, flown in by C-5 transport from the United States on 15 November, bringing the CH-53E total for the Task Force to 12 aircraft.⁵³

On 14 December, in support of the Task Force, the ACE conducted another assault support mission using CH-46Es and CH-53Es for an assault on Kandahar airport called “Task Force Sledgehammer.”⁵⁴ Other missions performed by the CH-53E in support of joint operations in Afghanistan, have included support of Coalition and Special Operations Forces (SOF), including one mission that resulted in a hard landing and major damage to a CH-53E.⁵⁵ Hastily, the CH-53E was used extensively to return USMC equipment and troops to the ships in the Arabian Sea once the MEU (SOC)s were replaced by elements of the US Army’s 101st Airmobile Division.

⁵³ “Marines kill 7,” 14.

⁵⁴ “Widening The Net,” *Marine Corps Times*, 24 December 2001, 14.

⁵⁵ Gordon Lubold, “Helo crash recovery required guts, ingenuity,” *Marine Corps Times*, 17 January 2002, 8.

Chapter 5

The Current Aviation Situation

The Marine Corps and the joint world of today are changing with new concepts of warfighting and equipment based on new technologies that will influence the battles we fight today and tomorrow. To understand the role that the CH-53E will perform in this new environment, an examination and comparison of the capabilities and missions of the proposed MV-22 and other services heavy lift assets are required to better evaluate the impact on the CH-53E and the missions it might be required to perform.

MV-22 Osprey

The Marine Corps replacement for the aging CH-46E medium lift assault support helicopter is the MV-22 tilt rotor aircraft. Because of delays in the program, due to design and software problems, the operational fielding of the aircraft will not occur before 2008. That means that from 2002 to 2008, the CH-46E will still be the medium lift aircraft of the Marine Corps to support the MAGTF and joint commanders in the war on terrorism or any other contingencies that may arise. This is not a new situation, but the continuing state of affairs since at least 1994, when the MV-22 was projected for fielding in 2001.

The MV-22 is designed to carry 24 combat equipped troops or a payload of 10,000 pounds internally or externally. The production aircraft is designed to be able to take off vertically and then transport 24 combat troops (in airplane mode) at speeds up to 230 knots for a maximum

distance of 272 nautical miles without refueling. This is a large improvement on the performance of the CH-46E. The MV-22 will also have the capability to refuel in the air, which will extend its range and give it over-the-horizon capabilities.⁵⁶

The greatest improvement in the MV-22 is in the area of survivability due to reduced vulnerability and susceptibility of the aircraft to various threats. This was one of the most important design requirements and has been proven and validated during its development.⁵⁷ The reduced vulnerability and increased survivability of the MV-22 is a major enhancement to assault support. Although this is a leap in the right direction for the future, the MV-22 is very expensive and the aircraft has yet to be fielded.

The MV-22 is supposed to perform the entire mission role of medium lift, as well as expand assault support mission tasks. The heavy lift mission will still be required to support the MAGTF by lifting large amounts of equipment, supplies, and troops to support all operations. The reality is that the MV-22 is designed as a primary troop transport for quick, long-range raids, with minimum capability to haul large equipment loads to sustain forces ashore. The MV-22 external capability is designed to haul a 10,000-pound load, which does not allow the aircraft to exploit its speed. This is because external operations are restricted to the speed that an aircraft can fly the load, based on the load's flight characteristics, not the speed that an aircraft can fly. External loads restrict the MV-22 to 130 knots, which reduces the range of the aircraft to a radius of only 105 nautical miles, unrefueled.⁵⁸ The speed of 130 knots is well within the capabilities of the CH-53E external operations, but the CH-53E can fly to a radius of 250 nautical miles unrefueled. The implications are self-evident.

⁵⁶ Marine Corps Warfighting Publication (MCWP) 3-24, *Assault Support*, Washington, DC: Headquarters United States Marine Corps, 2 August 1999, A-10. Cited hereafter as MCWP 3-24.

⁵⁷ Author's personal knowledge and conversations with operational test evaluation personnel while at HMX-1.

⁵⁸ MCWP 3-24, A-10.

When fielded, the MV-22 will enhance the capabilities of the ACE to provide assault support to the MAGTF and the joint commander over the CH-46E. This will result in more innovation in providing support for operations to support the MAGTF as the capabilities of the aircraft are explored. Many capabilities will have to be proven or disapproved when actual operations are conducted by the MV-22 because the real test will always be operations in the real world. However, the proven capabilities of the CH-53E to support the MAGTF will still be required and used.

The MV-22 is a major improvement over the CH-46E but in comparison to the CH-53E, the improvement in capabilities are confined to airframe max speed and survivability, with no increase in lift, troop capacity, cargo space, or range. The MV-22 will give the MAGTF and joint commanders more options because multiple assets will be available to accomplish a variety of missions, depending on the situation, and using both the CH-53E and the MV-22.

Heavy Lift in the Department of Defense

The joint environment requires us to consider how a Joint Task Force (JTF) commander employs the heavy lift assets of the Marine Corps. The JTF commander tailors assets to complete assigned missions with out regards to service affiliation. Desert One was a good example of this as the Task Force picked the asset based on its capabilities to accomplish the mission. A comparison between the CH-53E and the other service's heavy lift assets is needed in order to understand and appreciate the missions the CH-53E may have to perform in the joint and coalition environment.

United States Army

The United States Army employs heavy lift assets in support of Special Operation Forces (SOF) and in the conventional assault forces. The SOF units use the MH-47D/E Chinook and the Air Force MH-53J Pave Low III heavy lift helicopters for their operations.⁵⁹ While the U.S. Army conventional forces employ the heavy lift helicopter CH-47D Chinook in their Heavy Helicopter Battalions.⁶⁰ The mission roles between the SOF aircraft and the conventional aircraft vary in that the conventional Heavy Helicopter Battalions have the same mission role as the Assault Helicopter Battalions (UH-60s) in providing assault support of troops and equipment for the Division Commanders.⁶¹ The MH-47D/E has some added capabilities to support SOF units over the CH-47D with modifications that include larger fuel capacity, advanced avionics, and in-flight refueling system for long-range missions.⁶²

The Marine Corps doctrinal mission statements for the CH-53E are more closely related to the conventional Heavy Assault Helicopter mission of the CH-47D except that troop transport is a primary mission for the CH-47D. The actual CH-53E mission profile in support of MEU (SOC) missions more closely compare with the SOF MH-47's missions. The MH-47 mission is stated as:

The MH-47 conducts overt and covert infiltrations, exfiltrations, air assault, resupply, and sling operations over a wide range of environmental conditions. The aircraft can perform a variety of other missions including shipboard operations, platform operations, urban operations, water operations, parachute operations, FARP operations, mass casualty, and combat search and rescue operations.⁶³

⁵⁹ United States Special Operations Command, *Special Operations Forces Reference Manual*, (Fayetteville, NC: Cubic Applications, Inc., January 1998), 3-29, 5-34. Cited hereafter as USSOC, SOF ref manual.

⁶⁰ U.S. Army, Field Manual (FM) 1-113, *Utility and Cargo Helicopter Operations*. (Washington, DC: Department of the Army, 12 September 1997), A-3. Cited hereafter as U.S. Army FM 1-113.

⁶¹ U.S. Army FM 1-113, 1-3.

⁶² USSOC, SOF ref manual, 3-29, 3-30.

⁶³ USSOC, SOF ref manual, 3-29.

The capabilities are very similar between the CH-53E and the MH-47D/E with the only exceptions being maximum speed, total lift, avionics, and survivability equipment. The CH-53E has an increased lift capability and more speed than the MH-47 and CH-47. The MH-47 and CH-47 have better survivability with armor and an advanced Aircraft Survivability Equipment (ASE) package. The MH-47 is better equipped with avionics and navigation systems.

The United States Air Force

The United States Air Force's only heavy lift helicopter is the MH-53J Pave Low III. This helicopter's primary mission is special operations. The aircraft is the most technologically advanced helicopter in the world with advanced avionics and other mission systems.⁶⁴ The basic airframe is a modified twin engine H-53D but is air refuel capable with upgraded CH-53E blades and CH-53E engines. The MH-53J mission is stated as follows:

The MH-53J Pave Low helicopter is a night, adverse-weather special operations weapon system that was designed to be a flight lead platform for less capable aircraft. The primary mission of the MH-53J is to conduct covert low-level, long range undetected penetration into denied areas, day or night, in adverse weather for infiltration, or resupply of special operations forces to include airdrops and heavy lift sling operations.⁶⁵

The aircraft, in addition to its highly advanced avionics, has armor plating, self defense capability, and advanced aircraft survivability equipment.

The mission roles are generally similar for the CH-53E and the MH-53J in terms of carrying troops and equipment, except for the special operations mission requirements, consequently their capabilities are quite different. The MH-53J, with its advanced avionics, armor plating, and survivability equipment, is a more capable platform in high threat environments. Lift capacity,

⁶⁴ USSOC, SOF ref manual, 5-35.

⁶⁵ USSOC, SOF ref manual, 5-34.

speed, and performance are also very different because the MH-53J is based on the old H-53D airframe of the Vietnam era. Of note, the decision was made to replace the aging MH-53J with the CV-22 tilt-rotor vice the CH-53E, which was also considered as a replacement. But the CV-22 program has had the same delays and problems as the MV-22 since it is a joint effort between the Marine Corps and the Air Force.

Chapter 6

The Future

The world is changing, and at a quickening pace. The events of Pearl Harbor in 1941, the dropping of the atomic bomb, advances in computers, the end of the Soviet Union, and the events on 11 September 2001 have prompted major adjustments in how the United States military operates and plans to operate. The increasing cost of weapons systems and technology, and the drive to stay ahead of emerging threats with new technology, is forcing the military to change the way it operates and plans to operate.

The 21st Century

The U.S. Commission on National Security/21st Century published a paper on 15 September 1999 that addressed the future with respect to national security and outlined 12 issues on the future, three of which related directly to the military:

1. The United States will remain the principle military power in the world.
2. Weapons of mass destruction (nuclear, chemical, and biological) will continue to proliferate to a wider range of state and non-state actors.
3. We should expect conflicts in which adversaries, because of cultural affinities different from our own, will resort to forms and levels of violence shocking to our sensibilities.⁶⁶

The paper also reaches several conclusions based on its research, with 4 key conclusions out of 14 having a direct impact on the military:

⁶⁶ U.S. Commission on National Security/21st Century, *New World Coming: American Security in the 21st Century Major Themes and Implication*, Paper (Washington DC: GPO, 15 September 1999), 3. Cited hereafter as 21st Century, *New World*.

1. The essence of war will not change.
2. United States Intelligence will face more challenging adversaries, and even excellent intelligence will not prevent all surprises.
3. The United States will be called upon frequently to intervene militarily in a time of uncertain alliances and with the prospect of fewer forward-deployed forces.
4. The emerging security environment in the next quarter century will require different military and other national capabilities.⁶⁷

The future presents an asymmetric environment where in forward looking and innovative concepts of Operational Maneuver from the Sea (OMFTS), Expeditionary Maneuver Warfare (EMW), and the recent Ship to Objective Maneuver (STOM), will all have a place. The short-fall is that to achieve these concepts and to fight the type battle as outlined depends on the equipment and assets that are available to survive and support these concepts.

Theater Threats

The threats that the United States military has faced in the past decade, except for Iraq and Serbia, have been considered low based on the perceived beliefs in the capabilities of the forces we faced. This has caught many military forces, including the United States, by surprise. The United States, in supporting United Nations operations in Somalia, underestimated the urban warfare threat, which resulted in the failure of Task Force Ranger. The 3 October 1993 raid in Somalia resulted in the shoot-down and destruction of two highly combat capable SOF MH-60s and serious damage of four other MH-60s, with 19 Americans dead and 84 wounded.⁶⁸

The helicopter missions conducted for Operation “Enduring Freedom” in Afghanistan, to date, officially have not experienced any major threat that have resulted in the loss of any aircraft

⁶⁷ 21st Century, *New World*, 6, 7.

⁶⁸ Major Clifford E. Day, *Critical Analysis on the Defeat of Task Force Ranger*, ACSC Research Paper (Maxwell AFB, AL: Air Command and Staff College, March 1997), 11.

to enemy fire. However, the possibility remains very high. According to a CRS report to Congress dated 26 September 2001, threats in Afghanistan range from fixed SAM sites, man pads, anti-aircraft artillery (AAA), and small arms.⁶⁹ The Russians underestimated the smaller anti-air defense capabilities of the Mujahidin, which resulted in the loss of 333 helicopters shot down by both SAMs and small arms.⁷⁰

The worldwide helicopter losses, mostly to enemy AAA or SAMs, from 1973 to 2001 totaled 534. The United States lost 19 helicopters during this time period conducting military operations with 87 percent due to AAA and SAMs and the rest lost to small arms.⁷¹ The increased proliferation of AAA and SAMs throughout the world is a serious threat. This anti-air threat still exists for all forces operating in Afghanistan and future areas of operation because of the availability of these weapons, which cannot be underestimated. The sobering reality is that in future MAGTF operations a high asymmetric threat may exist at all times no matter what the mission.

⁶⁹ Christopher Bolkcom, "Operation Enduring Freedom: Potential Air Power Questions for Congress," CRS *Report for Congress* RS21020 (Washington, DC: Congressional Research Service, Library of Congress, 26 September 2001), CRS-3. Cited hereafter as CRS Report, *Operation Enduring Freedom*.

⁷⁰ CRS Report, *Operation Enduring Freedom*, CRS-4.

⁷¹ John Watkins and Al Stonge, *Aircraft Loss Summary 1972-2001: Rev 10.13*, (San Diego, CA: BAE Systems. 01 June 2001), Helo loss rev 2.9.

Chapter 7

The Risk

Vulnerability and survivability influenced the design of the MV-22. The original design of the CH-53E addressed the issue and made specific requirements for aircraft survivability, but these requirements were not incorporated into the final production model. The Marine Corps CH-53E community has been concerned about this issue as well and has, for years, made the issue of vulnerability and survivability a top priority for equipment and design changes to the airframe in many after action reports, lessons learned, and at Operational Advisory Group (OAG) seminars stressing ASE.⁷² Recent proposals to extend the life of the airframe to 2015 and beyond have required a Service Life Extension Program (SLEP). This program has made the requirement for ASE and vital component protection, with armor and ballistic tolerant components, a high priority.⁷³ This issue has also been addressed and stressed with improved flight tactics taught to all crews to use acquisition denial tactics and improved threat analysis. This issue is an important one because the CH-53E can carry 37 combat troops and up to 55 with a crew of 4 to 6. This could result in the loss of between 43 to 61 troops if an aircraft is lost.

The Marine Corps has reinforced the risk issue of using the CH-53E in the assault support role in its arguments for the MV-22 as outlined in this statement in the Congressional Budget Office in its report:

The Marine Corps argues that the CH-53E does not meet its requirements for amphibious assault mission for a number of reasons. First, the slower CH-53E is less likely than the V-22 to survive in hostile environments. Even if the V-22 is purchased, CH-53Es will need to transport heavy items of equipment that the V-22 cannot carry.

⁷² Assault Support Operational Advisory Group, *CH-53E Top Ten Priorities*, Documents, 1997-2001, C.

⁷³ PMA 261, newsletter, 2.

Since many of those items will be needed early in battle, CH-53Es will therefore need to be part of the first assault wave. But Marine Corps doctrine dictates that the first assault wave be delivered by a more survivable aircraft than the CH-53E. Furthermore, Marine Corps personnel suggest that CH-53E might not be able to build up sufficient forces fast enough to stop enemy troops who might arrive soon after operations begin. The problem of building up forces quickly might be at least partially overcome if each CH-53E carried more troops, but the Marine Corps argues that CH-53E are too unwieldy and vulnerable to carry large troop loads.⁷⁴

This statement is a doctrinal “Catch 22” based on how the MAGTF will realistically operate.

The fact is that the CH-53E has the capability to rapidly build up combat power with its troop carrying and equipment capacity. An example of this is the raid into Afghanistan, which proves that the CH-53E is the best asset for the MAGTF and the joint commander. The MAGTF or joint commander may want to use the capabilities of the CH-53E. However, this may be unwise because the risk may be too high.

⁷⁴ Congressional Budget Office, “Reducing The Deficit: Spending And Revenue Options.” *DEF-10 Cancel The Marine Corps V-22 Aircraft Program and Buy CH-53E Helicopters*, Report (Washington, DC: GPO, March 1997), 1.

Chapter 8

Conclusion

Marine Corps doctrine for helicopter assault support is separated into three distinct mission roles: light/attack, medium, and heavy. The original mission of the heavy lift helicopter was for logistical support and combat sustainability for forces conducting the battle. The medium lift mission was to be the combat troop transport and assault platform for moving the troops into the battle and then to support maneuver of the forces in the battle space to support the MAGTF commander's battle plan. The light/attack mission was to provide command and control and close air support for forces in battle.

These doctrinal mission profiles are still the same today, despite the future arrival of the MV-22 and new operational concepts. The heavy lift mission of the CH-53E is still to support the logistical and combat support aspect of the battle plan. The CH-53E will still be required to do this job.

Until the MV-22 arrives, the CH-53E will continue to be the asset of choice to the MAGTF and joint commander. The question now is whether the CH-53E mission has changed and expanded beyond its capabilities and design.

The mission of the CH-53E has expanded beyond the original intentions of its designers and beyond the stated mission roles as outlined in current doctrine. This has not been beyond the capabilities of the airframe.

The CH-53E capabilities to accomplish all these missions to increase the combat effectiveness of the MAGTF is well known, but not completely used by the MAGTF and joint

community. The old doctrine of heavy, medium, and light helicopter missions is outdated and needs to be revised and updated. The doctrinal missions need to be based on the capabilities of the aircraft and what they can add to the capabilities of the MAGTF.

The heavy lift mission has expanded and is well known and is stated in the Marine Corps Aviation Implementation Plan 2000-2001:

The introduction of the MV-22 will effectively remove the troop transport mission from the heavy lifter, the CH-53E- a secondary mission for that aircraft but one it has increasingly had to perform as a bridge to the arrival of the MV-22. In Essence, the CH-53E will come full circle back to its primary heavy lift mission – the mission that truly optimizes the capabilities of the Super Stallion.⁷⁵

Unfortunately, this statement is blind to all the capabilities of the CH-53E. The belief that we should go full circle and backwards in the future to a limited mission role and eliminate the expanded mission tasks that the CH-53E have been performing and developing over the years to support the MAGTF is unrealistic. The belief that the CH-53E is only performing these missions temporarily as a stopgap until the MV-22 is also unrealistic. This gives the impression that the airframe will not be updated, improved, or crew training will be changed to support these expanded missions. This is not innovative, but rather old school and traditional. One reason for this might be due to the threat environment and vulnerability of the CH-53E.

The continued expansion of the CH-53E mission in the future, whether the MV-22 becomes operational or not, is evident because the capabilities of the CH-53E will always be a factor that a MAGTF and joint commander will consider when tailoring forces to accomplish the mission. This is further supported in MCWP 3-24 *Assault Support*, which states under aircraft capabilities:

Although specific aircraft are best suited to perform certain missions, each squadron's task requires similar capabilities across the board. Versatile, multiple mission capable

⁷⁵ HQMC, AIP 00-01, B-3.

aircraft are essential in MAGTF operations and are foundation of Marine Corps aviation doctrine.⁷⁶

In all operations, real or training, the threat and risk must always be considered. MCWP 3-24, *Assault Support*, specifically states: “The decision by the MAGTF commander to employ assault support assets must be carefully weighed against the risk involved.”⁷⁷

At present, the MAGTF and joint commander must use what assets they have now, today, not what they might get tomorrow. This means that, although future concepts and doctrine sound good on paper, they do not do anything for the warfighter today. The “can-do” attitude of mission accomplishment in the CH-53E community, tempered with prudence, must be exploited to advise the MAGTF and joint commander. There must also be a balance between the capabilities of the CH-53E, the missions it is performing, and the risk that is involved in using the aircraft for these missions. This means that risks in performing operations in an asymmetric threat environment must be weighed before an asset such as the CH-53E, with its great capabilities, is used, otherwise the operation becomes a gamble with dire consequences if it fails.

The past cannot be changed, but one can learn from past experiences. In the past, many decisions have been made that were questioned as originally unwise but the outcome has been acceptable, so the issue has been forgotten. Some decisions may have had outcomes that were not as pleasant and resulted in failed missions and political backlash. To avoid this we must face the realities of today and realize that future concepts are by definition in the future. The Marine Corps seems to be focusing on the battles of tomorrow and does not see the battles to be fought today, with the assets we have today.

The CH-53E is performing an expanded mission because it has the capability to do so,

⁷⁶ MCWP 3-24, 3-4.

⁷⁷ MCWP 3-24, 3-4.

and will continue to perform these missions successfully. Outdated doctrine states that medium lift and the heavy lift helicopters are tasked with different roles in the MAGTF. This is not true and both the CH-53E and CH-46E have continued to cross over the mission tasks outlined in doctrine to support each other based on their capabilities. This will continue even when the MV-22 is fielded, because the CH-53E and MV-22 will have to mutually support and complement each other.

Aviation assault support doctrine must, therefore, be changed to reflect the realities of the capabilities of all aircraft and not limit aircraft due to traditional roles. This includes changing the training syllabuses to provide more in-depth training and cross-training in the assault support roles. The doctrine should reflect the innovation that the assault support community has developed to cover the shortfall in lift and continue to support new innovation and expansion of mission roles as capabilities are discovered. Therefore, doctrine should always reflect innovation, and transformation is always developed from innovation.

The most important issue today and in the future is the survivability and vulnerability of the CH-53E on the battlefield. This may present a risk that may not be acceptable, and must be addressed immediately by the Marine Corps. All effort must be put forth immediately to reduce the vulnerability of the CH-53E with improved ASE equipment, armor or other major component protection to increase the probability of mission success in the threat environment of today. The CH-53E must be brought up to the same standards of survivability as the MV-22 and other airframes (e.g. the MH-53J, MH-47, CH-47) so that its capabilities can be exploited in the joint environment. Otherwise, many missions may become a gamble.

The CH-53E community has recognized this issue and has been trying to decrease the risk by exploiting maneuver by using speed, surprise, and good planning. Improved training in

acquisition denial techniques and night flying has also allowed missions to be performed at acceptable levels in low threat environments. However, this may not be enough in the new asymmetric threat environments of the future where single battle concepts do not exist and future concepts, such as STOM and Sea Basing, exploit the capabilities of lift, speed and range of the CH-53E. This may require that more CH-53Es will need to be procured to support the future operations of the Marine Corps.

The battles being fought today and the future will require the CH-53E to continue in its role to meet the needs of the MAGTF and joint commanders. However, efforts to improve outdated doctrine and the airframe, with upgraded systems and service life extension, remain stagnant. The commander always asks for capabilities and not assets for the missions he needs to accomplish. This means the CH-53E will be a valuable asset in fulfilling these many missions of the future because of its great capabilities. History rewards the warfighter who recognizes the situation today and tomorrow and stays ahead of his adversary, but history punishes severely the warfighter who is blind and stagnant.

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